

## *Conservation and Demand Management Plan for Timmins and District Hospital*

Timmins and District Hospitals mission is to improve the health of the communities we serve. In recognition of the critical linkages between environmental health and public health, it is Timmins and District Hospitals desire to limit adverse impacts upon the environment resulting from the design, construction and operation of our health care facilities. We will address the life cycle impacts of facilities through design and construction standards, selection of materials and equipment, and maintenance practices.

We will adhere to the principals below and apply them to all aspects of our planning.

- *To continually look at opportunities to safely reduce energy consumption while maintaining quality of care.*
- *To reduce the consumption and cost of energy and apply those savings to patient care enhancements as well as to fund future energy initiatives.*
- *To get all staff involved in the principal of energy management and to act as environmental stewards of the hospital now and into the future.*
- *Apply sound financial principals when considering energy projects.*
- *Incorporate energy management Best Practises in all levels of our organisational planning.*

This plan is submitted for July 2014 however Timmins and District Hospital has been active in the area of energy management since 2000. Implementation of efficient and sustainable equipment and practises is key to energy management programs but also important is a strategy for procurement of commodities. Capable management of commodity procurement will result in significant reductions in utility costs which will free up funds for the implementation of future energy initiatives. Below you will find some of our past successes.

### **Historical**

- In 2004 TADH exited the RPP (Regulated Price Plan). This allowed TADH to take advantage of hourly electricity pricing (spot market) versus the higher fixed cost provided under the RPP. Over a three year period this move resulted in over \$300,000 in savings.
- TADH installed interval meters in 2005 which further reduced costs as we were charged based on real time electricity costs, meaning the spot market costs at the time electricity was consumed. Without a meter TADH would be charged a blended average rate over a 24 hour period which is more expensive as all users within the cities consumption patterns are used to calculate the blended rate.
- Since 2004 TADH has engaged a retail provider to read and report on all electrical use. Monthly reports are sent to TADH for review.
- A retail provider is also in place for the management of our natural gas procurement. This service has proved to be invaluable and has saved TADH over \$200,000. Consumption reports are also sent to TADH on a monthly basis.
- TADH was successful in obtaining a \$50,000 grant from the OPA to form an energy cooperative consisting of 10 hospitals in the region. As a result many of the sites in the group have benefited financially and obtained a new awareness of the importance of conservation and demand management.
- TADH is actively engaged with providers such as Union Gas and Hydro One which has and is resulting in obtaining substantial incentives.

- In 2009 TADH moved forward with the implementation of a 5.5 million dollar energy retrofit that resulted in a consumption reduction of close to 30% and over \$500,000 in annualised savings. See attachment titled retrofit for details.
- 2010 Timmins District Hospital was awarded the OHA's Green Hospital Award for energy efficiency.
- 2012 TADH introduced a steam trap survey as part of its regular preventative maintenance. TADH has an inventory of steam traps (100+) which are to be inspected and repaired each year. Our first review resulted in the replacement of over 30 traps. Union Gas estimates one defective trap results in the loss of over \$5,000 a year in natural gas so our initial repairs could save up to \$150,000.
- Replacement of over 40,000 square feet of roof, existing roof had an R-value under 10 and replacement roofs have an R Value of 34
- 2013 an additional assessment was completed at TADH, see attachment titled assessment. Should be noted this assessment was free as it was completed by the HELO TEAM which you can read about later in this document. Also please note the chiller plant described in this assessment is not the same type as selected by TADH. In working with the consultants it was later determined that installation of an Ice Plant was the preferred option. Information specific to the chiller plant can be found in the attachment titled Chiller Plant.
- For a summary of consumption and costs year to year for electricity, natural gas and water please review the attachment titled Utilities Summary.

The following is an outline of initiatives underway or planned for future years. This plan will be updated on a regular basis so it accurately reflects the work we are doing.

### ***Monitor energy usage***

Energy use is and will continue to be monitored by the following methods.

- Via interval metering (monthly, weekly, daily, hourly) we will expand this program to incorporate action items for demand management.
- Invoices will continue to be verified.
- Installation of pulse metering for monitoring of natural gas consumption.
- Installation of monitoring equipment. Our chillers will be monitored with this equipment to determine current consumption and then measured against consumption of our new chillier system. This is in place to maximise incentives offered through the LDC. Once complete the measurement and verification equipment can be utilised for other projects. See attachment titled Monitoring Equipment for further information.
- Building automation system allows TADH to manage all HVAC settings and adjust as required. The system is presently configured to adjust based on occupancy.
- Water is presently monitored through the invoices only however we will focus on this area over the next few years to determine what opportunities exist.

### ***Development of an Energy Team***

- Presently energy management is informally managed through Procurement and the Senior Management Team with input being provided by departments such as facilities as required. Over the next two years our intent is to formalise an energy team involving an expanded membership from all areas of the hospital.
- The team will develop achievable targets and goals every year and monitor progress.
- Write articles for inclusion into the hospital news letter.
- Offer opportunities for all staff to provide recommendations for improvement
- Provide a basic awareness of the importance of energy management.
- Offer training and awareness programs that all staff can apply to their work or home environments.
- Promote awareness through contests and promotions

- Identify energy reduction opportunities via studies and/or trials
- Continue to engage with external stake holders to share our experiences and to learn from their experiences.

Currently we are participating in a project lead by the HELO TEAM. Timmins and District Hospital is a member of the group. This initiative is funded by the Ontario Power Authority and is a collective effort between the Canadian Coalition for Green Health Care and Ches. The groups mandate is to review healthcare facilities across Ontario and provide recommendations for the implementation of energy savings measures. Their collective expertise has been invaluable for TADH with the planning of a few large projects.

### ***Current Projects***

It should be noted all projects as they are identified are reviewed with energy management/efficiency as a key consideration.

#### ***1. Chiller Replacement***

The plan is to replace the existing 20 year old system with a more efficient system. Current system consists of four 130 ton chillers. We will replace this with two 155 ton chillers and an array of nine ice storage tanks. During the evening when electricity costs are lower as demand is not as great the system will create ice in the 9 tanks. During the day the building will then be cooled from the ice storage tanks instead of running the chillers. This will provide the hospital with lower electricity costs due to the efficiency of the new units as well as cheaper utility costs during the day. Each storage tank provides for 25 tons of cooling capacity. Our hope is to receive over \$200,000 in incentives for this project under Hydro one Save on Energy Program. This project is planned to have all phases completed by the fall of 2014. For detailed information on this project see attachment titled Ice Plant.

#### ***2. Cogeneration Plant***

TADH has submitted an application for incentive to Hydro One for a detailed feasibility study to determine if a cogeneration plant is suitable for our facility. This study is fully funded by Hydro One/OPA and is expected to cost around \$50,000. This plant will provide in excess of 90% of the hospitals electrical needs through the utilization of a natural gas fired plant. Electricity costs are expected to rise 7% to 10% a year for the foreseeable future while gas prices are expected to be reasonable stable. In addition the plant will provide the hospital with a reliable system of power and not subject to power outages. Plant sizing will also afford us the luxury of adding many more devices to our emergency power system. The plant is also designed to capture and reuse the heat generated from the equipment which will result in reduced natural gas costs. Initial studies indicate the plant will cost approximately \$4.5 million and will generate over \$600,000 a year in savings. OPA incentives for this project should be between \$1,000,000 and \$1,800,000. We expect if this project moves forward it would be complete in 18 to 24 months. For detailed information on this project see attachment titled assessment.

#### ***3. Steam Trap Monitoring***

Given our past success with steam trap monitoring we are looking at ways of enhancing the current program of reviewing traps manually once per year. As mentioned earlier a defective trap can allow \$5,000 in gas to escape per year and TADH has over one hundred traps. The current system under review will allow TADH to monitor steam traps remotely via sensors and a wireless network, sensors are installed at the inlet of the steam trap and monitor heat loss, if loss is detected an alert is sent via the network and notifies us of which trap is defective. This will allow us to address defective traps immediately. Presently we are reviewing all aspects of the project and if the business case supports implementation we would move ahead in the late fall or spring. Union gas offers incentives for replacement of defective traps and may offer an incentive towards the capital investment for the wireless network.

Should the business case for remote monitoring not be favourable TADH will enhance its current manual system for reviewing steam traps.

#### ***4. Replacement of Medical Vacuum System***

In March of this year TADH replaced its aged medical vacuum system. New technology resulted in reduced electricity consumption; our estimates are a 25% gain in efficiency. In addition the new system is a waterless system which will reduce our overall water consumption.

#### ***5. Roof Replacement***

TADH will continue to replace existing roofs and complete approximately 15,000 square feet of roof per year. As the roofs are changed we will bring the R Value from an R7 to an R34 which substantially reduces our heating costs. Cooling costs are also reduced as we have switched roofing materials from a black EPDM membrane to a white Sarnafil membrane.

#### ***6. Window Replacement***

This summer we will be replacing 45 atrium windows and plan on replacing an additional 50 windows in 2015.

#### ***7. Laundry equipment***

Equipment in the laundry department is over twenty years old and in need of replacement. We will incorporate laundry equipment into the capital plan for replacement over the next five to seven years. Procurement will research leading edge technologies in laundry equipment and present a business case that will be financially sound while offering efficiency and sustainability. We will work closely with Union Gas and Hydro one in order to obtain maximum incentives.

#### ***8. DX Cooling***

TADH still has a number of air-conditioning units that are independent of the main chiller system, 12 units in total, most in the 5 ton range. We will identify the age of equipment and based on life cycle expectancy will add it to the capital plan as required. Instead of a direct replacement program we will plan to tie in the DX units into our main chiller plant and add capacity to this plant when and if required. Many of the existing DX units are very old so we will realize efficiency gains by utilising the new chiller plant.

#### ***9. Server Room Cooling***

Our server room is located on an outside wall of the hospital and initial reviews indicate this location may be ideal to take advantage of free cooling from the outside air. This technology would be utilized during the winter, fall and spring and evenings during the summer. The principle behind this technology is simple, it draws cool outside air regulates the temperature and releases the air into the area in question. The business case will be developed and if ROI is favourable we will proceed with implementation.

#### ***10. IT Equipment- Sleep mode***

Review options for implementation of sleep mode for computer systems where possible. Explore efficiencies against operation constraints.

#### ***11. Capital Equipment***

Presently all major equipment is reviewed with strong consideration given to efficiency and sustainability however with the formal adoption of this energy plan it is our belief that all staff will play a role in creating a more efficient and sustainable hospital. Over the next few years we will develop policy, provide training and awareness and create a culture of efficiency that will be demonstrated in our work and home lives.

## ***12. Water Conservation***

Consumption of water has not been given much attention in our energy efforts to date as consumption is stable at approximately 26, 0000 gallons per year and costs of \$285, 000 yr. are low when compared to the costs of natural gas and electricity. To further complicate the issue is that fact that changes to a system with such a low operating costs often presents a business case with significantly long pay back periods. The environmental impact of unnecessary water consumption is great and must receive attention in our energy management plans. TADH will over the next year begin to review options for reducing our consumption of water and over the next two years will have a formal plan in place specific to water. Options such as solar or on demand natural gas heating will be reviewed as part of our plan. Water consumption will be considered when purchasing any applicable equipment or supplies.

## ***13. Building Automation System***

Our building automation system is quite advanced and offers many features to operate our facility in an efficient manner. All HVAC systems can be controlled and settings for heating and cooling applied to any room in the building. Initial settings were established during our retrofit and designed to maximise efficiency while providing optimum comfort. It has been four years since the retrofit so we must establish protocol within our preventative maintenance system to ensure all settings are reviewed on an annual basis and returned to the initial set points. Changes to set points can occur for many reasons but we need to put systems in place to identify why the set point was changed and what needs to be fixed or adjusted to return to the original set point. A formal plan will be put in place to ensure set points are reviewed annually.

## ***14. BAS Lighting Controls***

Our building automation system is not tied into our lighting so we cannot control lighting by occupancy. We do have sensors in many of the public areas which activate the lights and staffs are very diligent at turning off lights at night but it is not enough. TADH will review the costs and benefits of linking the BAS system to the lighting throughout the building.

## ***15. Lighting General***

TADH will review and develop a business case for the replacement of all parking lot lighting with LED lighting.

## ***16. Recycling***

Presently TADH does recycle however we lack a formal plan or policy on recycling. Current efforts include:

- ✓ Fine Paper recycling
- ✓ Cardboard recycling
- ✓ Cans
- ✓ Plastics
- ✓ Food Waste
- ✓ Electronic waste

Recycling will become a part of the mandate covered by the formation of a formal energy team.

## ***17. Financing:***

Unfortunately typical funding models of the Ministry of Health do not give consideration for projects specific to efficiency or sustainability, funds for these projects needs to come from our operational budget or we must borrow the money. This approach significantly restricts the projects we can initiate as we are forced to implement projects that can provide a quick return on investment, sometimes the projects with a lower yield or return on investment can have a higher environmental impact. Despite this TADH will continue to seek out incentives wherever possible and advocate for new sources of funding. Below are a few funding sources we are actively involved with or have received funding in the past?

- OPA-\$50,000 Grant to form the network 13 Energy Cooperative

- Hydro One /OPA-Anticipate a rebate in excess of \$200,000 for our Chillier retrofit and approximately \$1,500,000 for the cogeneration plant
- Union Gas-Received \$190,000 in incentives for our energy retrofit. Possible incentives for our steam trap capital equipment. Larger incentive for our Cogeneration Plant.
- HELO/OPA. We will continue to utilize the free consulting services of this group.
- NRCAN- Continue to utilise Energy Star program as well as the educational sessions offered by NRCAN.
- Advocate to the Ministry of Health, Ministry of Energy and the LHIN'S to provide funding for hospitals to implement efficiency measures.

### **Summary**

The Timmins and District is committed to energy efficiency and sustainability and we believe this is clearly demonstrated through our past, current and future projects. Our board, staff and senior management team are committed to sustainability. Wherever possible we will advocate and implement change that will result in a greener tomorrow.